THE SELECTIVE USE OF PORTLAND CEMENT

NORTH AMERICAN CEMENT CORPORATION

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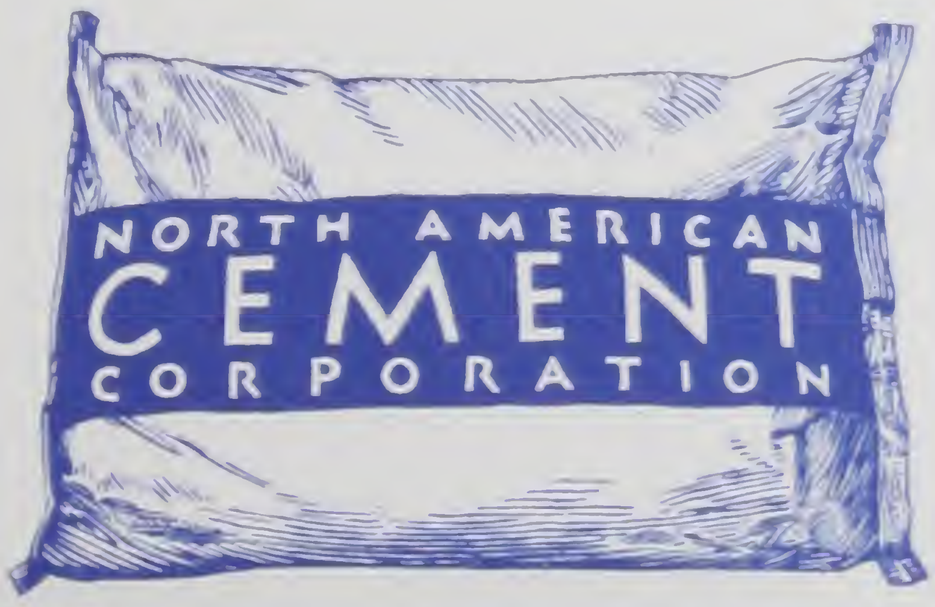
with particular reference to high-early-strength portland cement and normal portland cement



NORTH AMERICAN CEMENT CORPORATION

Offices: Albany · Boston · New York · Baltimore · Washington
Plants: Catskill, N.Y. · Howes Cave, N.Y. · Security, Md. · Martinsburg, W. Va.


WET WT.
NORTH AMERICAN
PORTLAND CEMENT
94 LBS.


WET WT.
BLUE STREAK
HIGH-EARLY-STRENGTH
PORTLAND CEMENT


WET WT.
BLUE BOND
MORTAR CEMENT
70 LBS.

THIS BOOK has been compiled to assist architects and engineers in designing and specifying; and to assist contractors and users in selecting the type of cement suited to the various needs of concrete work. The book is not a compendium of the art of making concrete, but has particular reference to the economies effected by the use of Blue Streak High-Early-Strength Portland Cement.

1331 U STREET, N.W., WASHINGTON, D. C. Architect: A. S. J. Atkinson, Washington, D. C. Consulting Engineer: Howard M. Lloyd, Washington, D. C. Contractor: Ostrow & Glassman, Washington, D. C.

Urgent need for occupancy was answered by the use of Blue Streak for the superstructure. Entire job was completed in a third of the time required with normal cement. With a temperature range of 34° F. to 49°, concrete for 23 ft. and 57 ft. spans designed for 125 lb. live load was poured and cured without heat protection. Job cured cylinders tested over 3000 lbs. in two days. Average of 28-day tests was 5400 lbs. Form removal in 2–3 days allowed quick re-use to save three-fifths of normal form cost. Shorter job duration because of rapid curing also cut job overhead—caused economy all along the line.

THE SELECTIVE USE OF PORTLAND CEMENT

TYPES OF CEMENT

Portland Cement, in the fifty years since it was first manufactured in this country, has come to be the most versatile of basic building materials. Because of it, engineering design has been widely influenced in adapting concrete to every conceivable type of construction.

Until a relatively few years ago, the requirements of cement users were satisfied by one type of portland cement. With the constantly increasing experience with cement under every conceivable job condition came a realization of advantages which would result from the availability of various types of portland cement to meet special engineering requirements and unusual job conditions.

The manufacture of high-early-strength portland cement marked the first major development in meeting the new demands. Since then, always collaborating with cement users, the cement industry has, through research and constant experiment, developed other types of portland cement until today the latest American Society for Testing Materials specification, C150-41, provides for five types of portland cement.

Type I, except for improved physical and chemical requirements, is essentially the same product which has been manufactured since the inception of the industry. It is used for general concrete construction.

Type II cement, due to its special chemical and physical characteristics, produces concrete of moderate heat of hardening.

HALIFAX COURT, RALEIGH, N. C. Architect: Wm. Henry Deitrick, Raleigh, N. C. Contractor: T. A. Loving & Co., Goldsboro, N. C. Cold weather was the reason why Blue Streak was used for paving. Compared with the use of normal cement, 15 days were cut from the job time and curing expense was minimized. North American Normal Cement and Blue Bond Mortar Cement were also extensively used for this project.

GULF OIL CORPORATION, GAS PUMP ISLAND, ALBANY, N. Y. Contractor: A. Ross, Albany, N. Y. Within 4 hours after pouring this base for gasoline pumps with Blue Streak the pumps were in operation. The contractor figures he saves $8.00 by using Blue Streak on a job like this —there is no lost time waiting for concrete to harden —continuous operation is possible to finish up the job quickly and release labor for other work.

It has a somewhat broader field of use in concrete construction than Type I cement.

Type III, High-Early-Strength cement, is used for general concrete construction where high early strength is economically desirable.

WAR PRODUCTION BOARD

General Limitation Order L-179

permits manufacture of A.S.T.M. Types I, II and III only, during the period of National Emergency.

Always among the foremost in research, the North American Cement Corporation has been quick to apply to its manufacturing every proven discovery which would be advantageous to cement users.

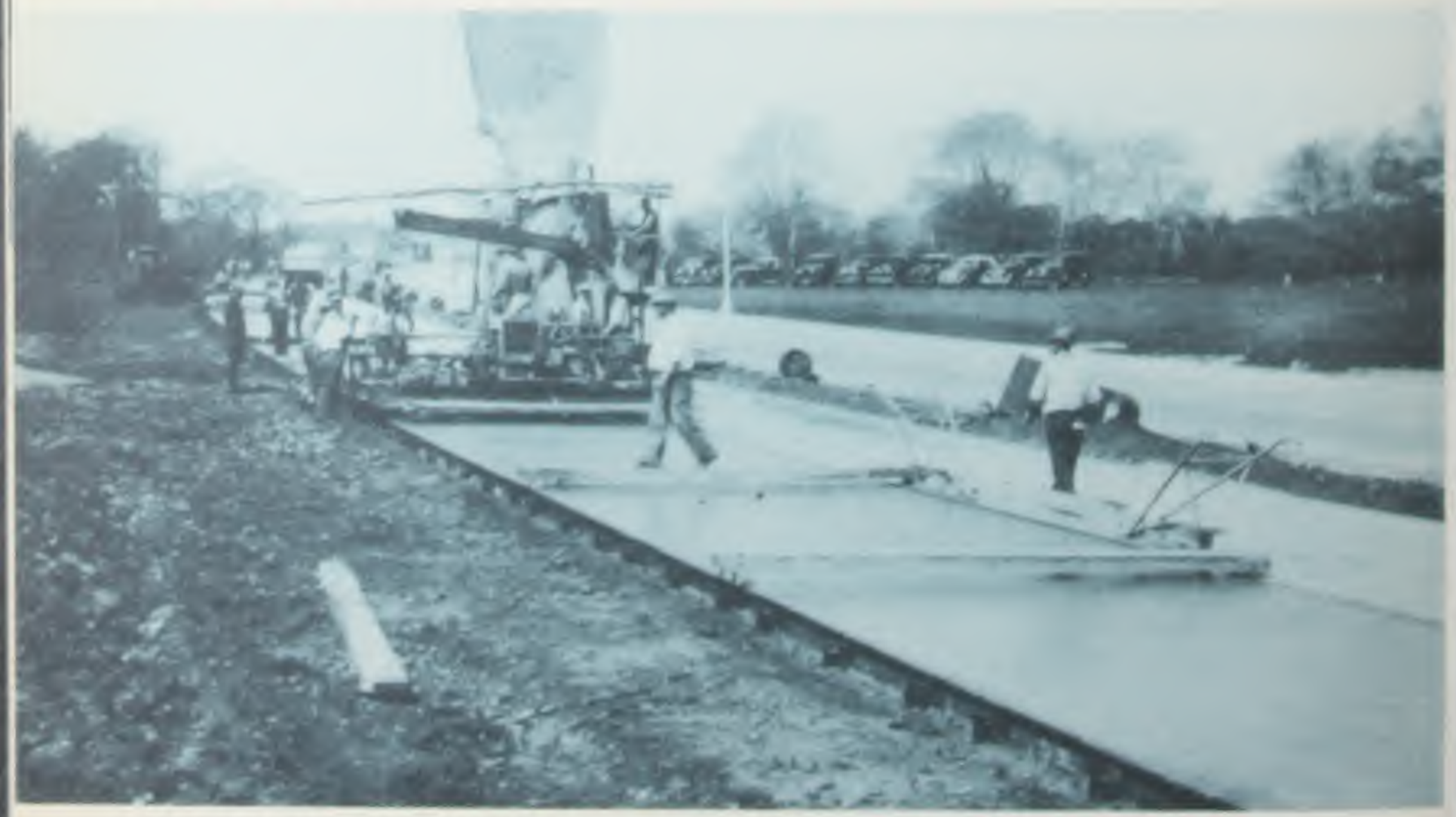
NORTH AMERICAN CEMENTS

Cements manufactured by the North American Cement Corporation meet the A.S.T.M. specifications, Federal specifications and those of various state and municipal departments. Types I, II and III are stocked regularly at all North American plants—Types IV and V, due to the limited demand for them, are furnished only on special order.

North American Blue Streak High-Early-Strength Portland Cement was manufactured and in extensive field use for many years before the adoption, by the A.S.T.M. in 1939, of the standard specification for high-early-strength portland cement.

For the purpose of brevity, North American Portland Cement (Type I and Type II) will be referred to in this book as "normal" portland cement, and North American Blue Streak High-Early-Strength Cement (Type III) will be referred to as "Blue Streak" or "High-Early."

DAM, BINGHAMTON, N. Y. City Engineer: John A. Giles. Contractor: Binghamton Construction Co. Dam repairs were needed in the fall of 1940. Threatening high water and impending winter demanded speed. Best quality concrete of maximum density was essential. Using Blue Streak, the job was completed quickly—three weeks less time than with normal cement.



NEW YORK STATE HIGHWAY AT FREEPORT, L. I. Engineer for New York State: Arsen Charchian. Contractor: Ralph Jannotta, Roslyn, N. Y. Long Island's great highway system is heavily traveled. Fast construction is imperative for service to the motoring public. Blue Streak was used for one lane of this section and traffic was allowed on new concrete in 48 hours.

Also recognizing the advantages to the building trades of a general-purpose masonry mortar cement, in line with its policy of satisfying the complete cement requirements of its customers, North American some few years ago perfected its Blue Bond Mortar Cement. This product meets Federal Specification SS-C-181b for Masonry Cement and also American Society for Testing Materials Specification C91-40. With only sand and water to be added, it provides economically the means for obtaining a superior masonry mortar suitable for laying up the various types of masonry units. It is also used for stucco.

SELECT CEMENT ACCORDING TO REQUIREMENTS

Since (Types I and II) North American Portland Cement and (Type III) Blue Streak High-Early meet the conditions of the vast majority of concrete jobs, the information in this book has particular reference to these types of cement. Only the fundamentals of the art of making concrete are covered to serve the purpose of assisting cement selection. Should any reader wish more detailed data on the design and control of concrete mixtures, the North American Cement Corporation will, on request, gladly send a copy of the Portland Cement Association booklet on this subject.

IMPROVEMENTS IN MAKING CONCRETE

Vast improvements have been made in recent years in the methods of producing concrete. Probably the most significant development has been the general application of the water-cement ratio principle whereby pre-determined strength concrete may be obtained at a given time after placing and curing under prescribed conditions.

This advance in the art of making concrete, together with the general improvement of portland cement for increased strength, has made the specification and production of concrete to meet minimum strength requirements common practice.

Rockland Concrete Sales Company, Inc., North Bergen, N. J., where the concrete units for the Clason Point Housing project were manufactured.

CLASON POINT HOUSING CONTRACT NO. 6, Borough of the Bronx, New York. Architects: York & Sawyer; Aymar Embury; Burton & Bohm, New York City. Contractor: Tobias Heller Company, New York City.

For the 46 buildings comprising this contract, 300,000 cinder concrete units, 8 x 8 x 18, made with Blue Streak, were furnished by Rockland Concrete Sales Company, Inc., North Bergen, N. J.

Better products, quicker deliveries, lower manufacturing costs, lower overhead expense result from the use of Blue Streak, High-Early-Strength Cement is used for the entire output of the Rockland plant.

Through the application of the water-cement ratio principle and ample field experience in its use has come the recognition that it is possible to produce concrete of a strength sufficient for specific structural requirements, yet with a water content too high for many types of exposure.

CHARACTER OF EXPOSURE IS PRIME CONSIDERATION

Therefore no less an authority than the Joint Committee* on Standard Specifications for Concrete and Reinforced Concrete recommends that the character of exposure be of primary consideration when designing a concrete mix. This committee also places special emphasis on those factors which affect workability and the production of dense homogeneous concrete.

Durability and watertightness in concrete are controlled by the relative proportions of cement and water and the extent to which adequate curing is provided. Hence the water-cement ratio principle is not discarded but given emphasis in relation to the exposure conditions of the concrete rather than to the compressive strength requirements.

Table 1, on the following page, is reprinted from the report of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete, submitted in June, 1940. In this table are shown the recommended water contents for concrete intended for various conditions of exposure. These are based on the assumption that the concrete will be plastic and workable, and placed and compacted in such manner that a dense homogeneous mass will be obtained. They also presume that the concrete will be sufficiently protected from loss of moisture and from low temperatures to insure that proper hardening will develop.

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*Affiliated Committees of the American Concrete Institute, American Institute of Architects, American Railway Engineering Association, American Society of Civil Engineers, American Society for Testing Materials and Portland Cement Association.

CHEVY CHASE ICE PALACE, WASHINGTON, D. C. Architect, James F. Hogan, Washington; Roger T. Hall, Designing Engineer, Washington; Owner - Contractor, Kass Realty Co., Washington. For quick construction and for economy Blue Streak was used in the superstructure of this recreation building. Compared with the use of normal cement, quick curing with Blue Streak cut form costs by two thirds and produced service strength concrete in one-fourth the time thus making possible profitable occupancy of the building weeks sooner.

TABLE 1.—WATER CONTENTS SUITABLE FOR VARIOUS CONDITIONS OF EXPOSURE (GAL. PER SACK OF CEMENT)

Type or Location of Structure	Severe or Moderate Climate, Wide Range of Temperatures, Rain and Long Freezing Spells or Frequent Freezing and Thawing					Mild Climate, Rain or Semi-Arid, Rarely Snow or Frost				
	Thin Sections		Moderate Sections		Heavy and Mass Sections	Thin Sections		Moderate Sections		Heavy and Mass Sections
	Reinf.	Plain	Reinf.	Plain		Reinf.	Plain	Reinf.	Plain	
A. At the waterline in hydraulic or waterfront structures or portions of such structures where complete saturation or intermittent saturation is possible, but not where the structure is continuously submerged:										
In sea water	5	5½		6		5	5½		6	
In fresh water	5½	6		6½		5½	6		6½	
B. Portions of hydraulic or waterfront structures some distance from the waterline, but subject to frequent wetting:										
By sea water	5½	6		6		5½	6½		7	
By fresh water	6	6½		6½		6	7		7½	
C. Ordinary exposed structures, buildings and portions of bridges not coming under above groups	6	6½		7		6	7		7½	
D. Complete continuous submergence:										
In sea water	6	6½		7		6	6½		7	
In fresh water	6½	7		7½		6½	7		7½	
E. Concrete deposited through water	*	*	5½	5½		*	*	5½	5½	
F. Pavement slabs directly on ground:										
Wearing slabs	5½	6	*	*		6	6½	*	*	
Base slabs	6½	7	*	*		7	7½	*	*	

G. Special cases:

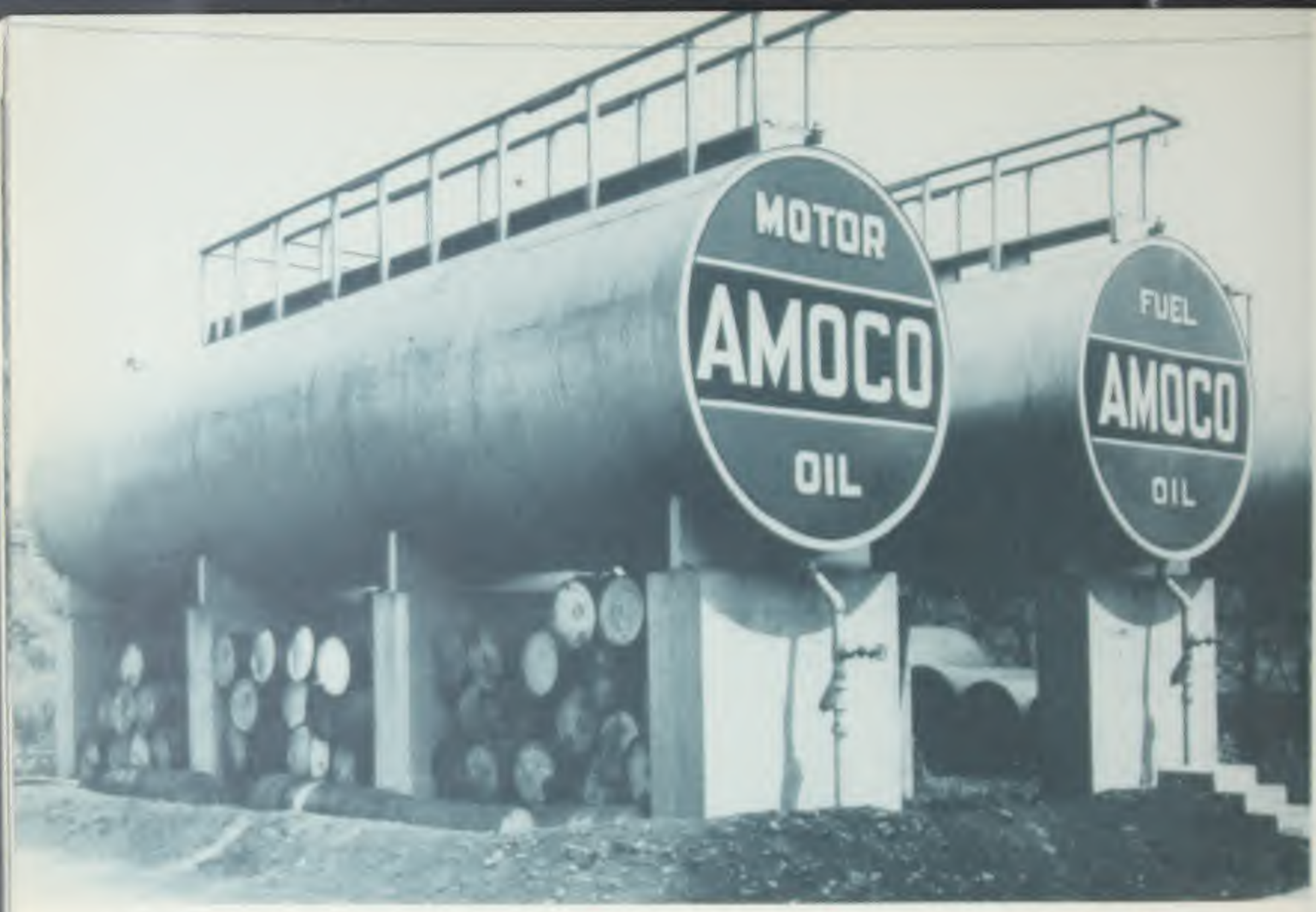
(a) For concrete exposed to strong sulfate ground waters, or other corrosive liquids or salts, the maximum water content should not exceed 5 gal. per sack. See Sec. 609.

(b) For concrete not exposed to the weather, such as the interior of buildings and portions of structures entirely below ground, no exposure hazard is involved and the water content should be selected on the basis of the strength and workability requirements.

*These sections not practicable for the purpose indicated.

RECONCILIATION FOR EXPOSURE AND STRENGTH

When following the recommended water content given in Table 1, it may happen frequently that in meeting the exposure re-



X-CEL OIL CORPORATION, ELMIRA, N. Y. Architect: Donald Fudge, Elmira, N. Y. Contractor: Personius & Eck, Elmira, N. Y. Blue Streak was used for tank foundations because quick completion and early use were of paramount importance. The contractor estimates the use of Blue Streak helped complete the work two weeks earlier than would have been the case with normal cement.

In the buildings illustrated Blue Bond Mortar Cement was used for laying up masonry units and for exterior stucco.

quirements the compressive strength requirements will be exceeded. Also, it may be found that in meeting the compressive strength requirements, a lower water content will be required than that needed for the exposure conditions.

Table 2 shows the strengths now commonly obtained at 28 days with normal portland cement and at 7 days with high-early-strength cement. The 8 mixes shown provide for the entire range of exposures covered in Table 1. (The values shown for attainable strengths are based on the assumptions of the Joint Committee report Sections, 304C and 306.)

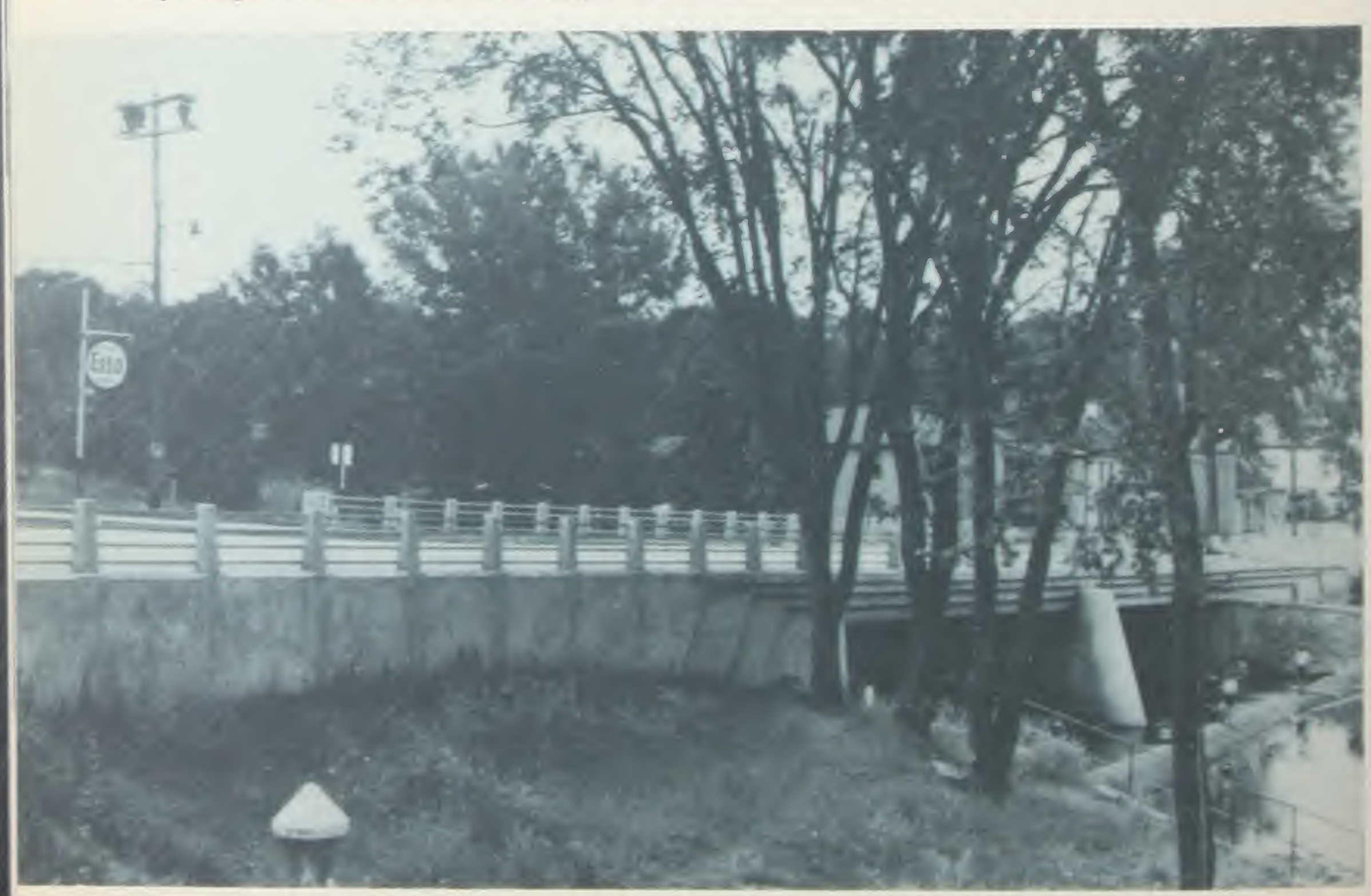
TABLE 2

	With Normal Portland Cement	With High-Early-Strength Portland Cement
Maximum Allowable Net Water Content Gal. Per Sack of Cement	Probable Minimum Obtainable Compression Strength at 28 Days P.S.I.	Probable Minimum Obtainable Compression Strength at 7 Days P.S.I.
5	5000	5000
5½	4500	4500
6	4000	4000
6½	3600	3600
7	3200	3200
7½	2800	2800
8	2500	2500
8½	2000	2000

HIGH-EARLY-STRENGTH CEMENT COMPARISON

High-early-strength portland cement differs from normal portland cement in the relative proportions of the major compounds and in fineness. These differences result in a more rapid hydration of the cement particles, with consequent faster hardening of the concrete. It should be noted that concrete made with early-strength cement gains strength several times more rapidly, especially in the early stages. The use of high-early-strength

NEW YORK STATE HIGHWAY BRIDGE, BALLSTON SPA, N. Y. Engineer: H. B. V. Humphrey. Contractor: The Belmar Company, Troy, N. Y. Expedition accounted for the specification of early-strength cement by the New York State Highway Department for paving the road-bed of this bridge. Blue Streak was used.



cement does not, however, necessitate extra haste in transporting or placing concrete on the job, nor is there any restriction in its use for ready mixed concrete.

In addition to its faster hardening quality, high early strength cement makes it easy to use the lower water-cement ratios, and to obtain the best quality concrete of maximum density.

COMPARING PRACTICAL VALUES

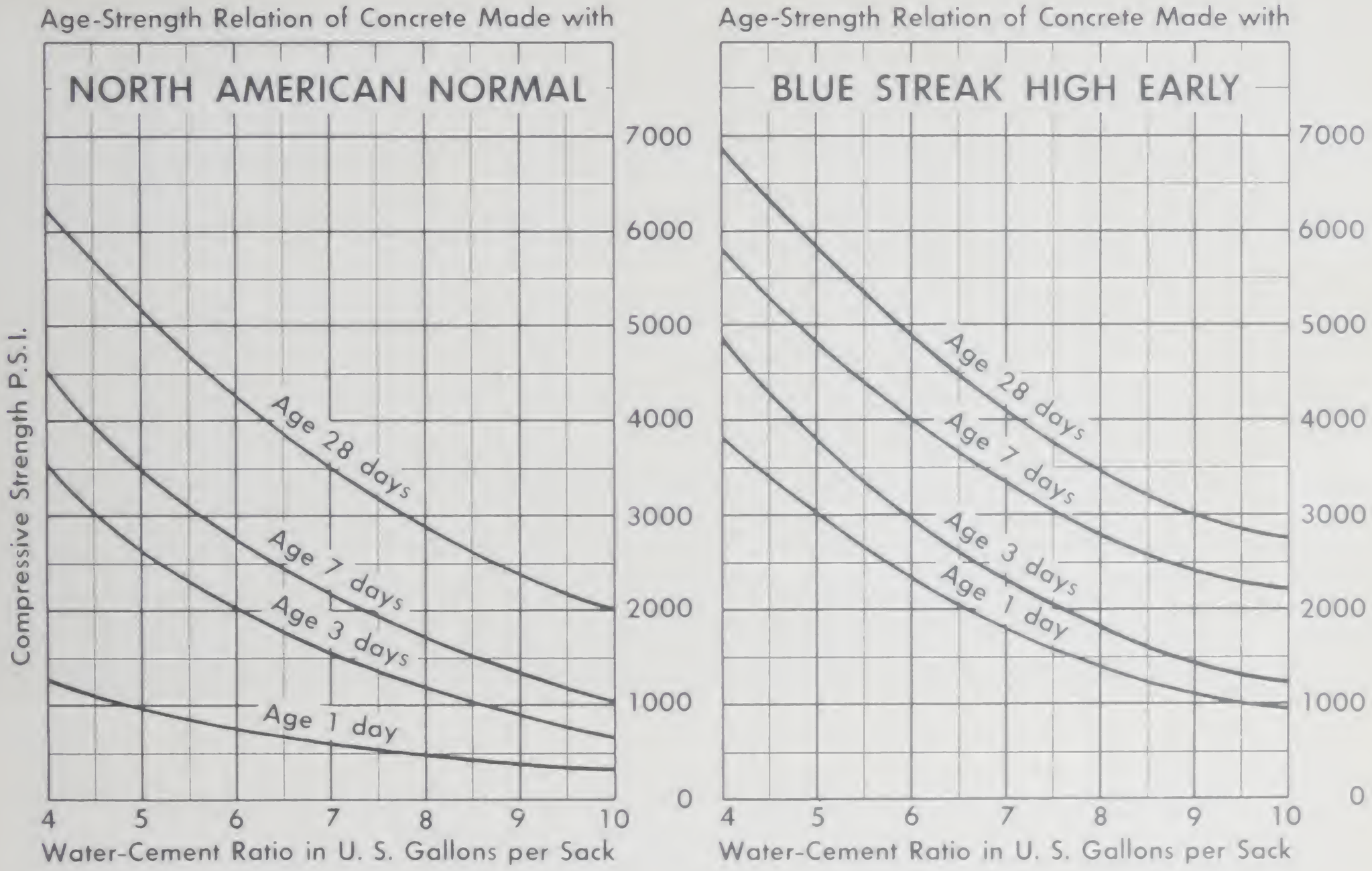
The relative compressive strengths in p. s. i. of concrete made with North American normal cement and Blue Streak high-early-strength cement are shown by the following table and graph:

AGE-STRENGTH RELATION BETWEEN CONCRETE MADE WITH NORTH AMERICAN NORMAL CEMENT AND BLUE STREAK HIGH-EARLY

(6″ x 12″ cylinders made, cured, capped and broken strictly in accordance with A.S.T.M. procedure. See C-31-39 and C-39-39.)

	1 DAY		3 DAYS		7 DAYS		28 DAYS	
Water-Cement Ratio. Gals. Water Per Sack Cement	With Normal Cement	With Blue Streak High-Early	With Normal Cement	With Blue Streak High-Early	With Normal Cement	With Blue Streak High-Early	With Normal Cement	With Blue Streak High-Early
4.0	1250	3900	3600	4950	4600	5800	6200	6850
4.5	1100	3500	3100	4300	3950	5300	5800	6400
5.0	950	3000	2700	3800	3600	4800	5200	5800
5.5	850	2700	2300	3350	3200	4400	4800	5400
6.0	750	2350	2050	2950	2800	4000	4400	4900
6.5	650	2100	1800	2600	2500	3700	3900	4600
7.0	600	1800	1600	2300	2200	3400	3600	4200
7.5	550	1600	1400	2050	1950	3100	3300	3800
8.0	500	1400	1200	1800	1750	2800	2900	3500
8.5	450	1250	1050	1600	1550	2600	2700	3200
9.0	400	1100	900	1450	1350	2400	2450	3000

RECORDS STORAGE BUILDING, Norfolk and Western R.R., Roanoke, Va. Architect and Engineer: Engineering Dept., N. & W. R.R. Contractor: B. F. Parrott & Co., Roanoke, Va. Speedy completion was imperative. Blue Streak was used for the concrete beams and floor slabs; and forms were stripped in three days instead of fourteen. Necessary expedition of construction was achieved—building was occupied 33 days sooner than would have been the case with normal cement. Form expense was reduced since only one set of forms was needed with Blue Streak.



CAREFUL CHOICE OF W/C RATIO

Regardless of whether normal cement or high-early-strength cement is considered, w/c ratio should be determined by the exposure requirements of the job. This is emphasized because, from the tables, it is apparent that, for given strengths required at early stages, with the higher w/c ratios possible using high-early-strength cement, fewer bags of cement would be needed than with the lower w/c ratios necessary to produce equal strength with normal cement.

For example, a compressive strength of 2000 p.s.i. is required at 3 days. A w/c ratio of 7½ gallons per sack with high-early-strength cement would produce this strength at 3 days, whereas a 6 gallon w/c ratio is necessary with normal cement. Obviously more cement would be required to produce concrete of the proper consistency or workability. However, if the exposure condition was such that a 7½ gallon w/c ratio was satisfactory, the lesser quantity of high-early-strength cement needed might effect a material saving. This, of course, is based upon an ulti-

BUILDING UNITS, INC., BALTIMORE, MD., use "High Early" for 90% of their output. Compared with the use of normal cement, products are handled 7 to 10 days sooner. This extra speed cuts manufacturing and storage space by 25%, enables a 25% smaller investment in pallets, allows carrying a one-third smaller inventory, and facilitates delivery.

133,000 cinder concrete units made with Blue Streak were furnished by Building Units, Inc., for these houses erected by Rockleigh Development Co., on Sulphur Spring Road, Arbutus, Md.

mate strength of 3800 p.s.i. being satisfactory for the job. In such an instance the job should be figured both ways.

A BALANCED MIX ESSENTIAL

The lower the water content of a concrete mixture, the stronger the resulting concrete will be if the mixture is plastic and readily workable. Durability in concrete also depends upon the ability to place concrete in a dense, compact mass of uniform consistency. In addition, the extent and conditions of curing have an effect upon durability.

A mixture which is too wet segregates in handling. A mixture which is too dry cannot be properly compacted. This necessitates a balance in the mixture to insure the required durability and strength; and a combination which will give proper consistency, plasticity and workability. Consistency refers to state of fluidity and plasticity serves to describe a consistency of concrete which does not crumble, but flows sluggishly without segregation. Such a mix can be readily molded and changes form slowly if the mold is removed.

Workability indicates the ability to place the concrete to readily fill forms and to be properly compacted around reinforcing rods.

In achieving these qualities in a concrete mix the choice of the cement for any given set of job conditions deserves careful consideration.

FACILITY WITH HIGH-EARLY-STRENGTH CEMENT

Since water-cement ratio, consistency, plasticity, workability and curing all combine to produce quality concrete, the choice of cement is influenced by—

1. Economy.
2. Ease of obtaining a plastic, workable mixture.
3. The length of time allowable for curing.

CONCRETE PLANK COMPANY, INC., JERSEY CITY, N. J. Better quality products and quicker delivery result from the use of Blue Streak in a large percentage of the production. In addition, the time savings make possible a substantially smaller mold investment, reduced floor space for manufacturing, and a smaller inventory.

BEDFORD HILLS CONCRETE PRODUCTS COMPANY, BEDFORD HILLS, N. Y. The extensive use of Blue Streak for block, pipe and joists is an economy in this plant. Lower investment for molds, greatly reduced manufacturing area, and smaller inventory are advantages which result from the ability to handle products in about half the time required when normal cement is used. In addition, the use of Blue Streak facilitates delivery of special orders and helps maintain high quality.

High-early-strength cement is a little higher in price than normal cement, but even in cases where quick use of concrete is not mandatory, economy often results from its use.

ECONOMY

As reference to the table on page 17 shows, concrete made with high-early-strength cement at 24 hours exceeds the strength of concrete made with normal cement at 3 days. This rapid hardening at the early stages has many practical advantages.

1. Forms may be removed and concrete put to use in 12 to 24 hours under normal conditions. Cost savings may result because of ability to promptly re-use forms, thereby reducing the number of form sets required.

2. The length of time during which high-early-strength cement must be moist cured is correspondingly less. This means lower curing costs.

3. In cool weather, high-early-strength concrete quickly cures beyond the stage where it might be damaged by frost. At freezing temperatures, when heat protection is needed to maintain 70° curing temperature, the length of time that such protection must be supplied is reduced by from two-thirds to a half. This results in substantial cost reductions.

4. Earlier use of concrete made with high-early-strength cement reduces idle time—construction may be practically continuous. Completed portions of a job may be used as working bases, for storage. Masons, plumbers, electricians, etc., can get in sooner.

5. For roads, streets, bridges, driveways, loading platforms, with high-early-strength cement there is minimum interruption to use. Concrete placed in one traffic lane at a time frequently avoids barricades at intersections; often avoids long, costly, hazardous detours on road and street work.

NEW YORK STATE HIGHWAY BETWEEN NORWICH AND SOUTH NEW BERLIN. Engineer for N. Y. State: Matthew Lee. Contractor: Davis & Stearns, Whitesboro, N. Y. Sections of road poured with Blue Streak were open to traffic in 2 days. Time when one-way traffic was maintained on various portions was reduced by 8 days, thus reducing hazard and inconvenience of slowed-up travel to a minimum.

NEW YORK STATE HIGHWAY BETWEEN COBLESKILL AND RICHMONDVILLE. Engineer for N. Y. State: H. B. Atkinson. Contractor: Madison County Construction Co., Madison, N. Y. Compared with normal cement use, 8 days were saved on each section poured with Blue Streak. This time saving expedited completion to reduce hazard and public inconvenience.

Such time saving results in public economies and convenience.

6. High-early-strength cement brings any type of work to quicker completion, thus reducing overhead costs and the expenses incident to the time when property is out of use.

PLASTICITY AND WORKABILITY

Due to an increase in compounds that produce high-early-strength and to an increase in fines, Blue Streak, when used in concrete with minimum water content, forms a fatty, plastic paste which thoroughly coats the aggregate and compacts readily to fill all the voids. The finer cement more readily combines with the water, thus materially aiding density, which is so vital in obtaining durable concrete of maximum watertightness.

In choosing cement for a particular job these qualities of Blue Streak often are the determining factors which make it preferred.

CURING TIME

As already pointed out, high-early-strength cement cures to working strength in a much shorter time than normal cement. It is more rapid in combining with water, which is advantageous where wet curing for a protracted period is difficult or expensive. In placing concrete under water this shorter curing time is especially valuable.

Fresh concrete exposed to the action of sun and wind tends to "dry out" rapidly and may become impaired. The faster curing of early-strength cement materially reduces the time when the concrete may be subject to damage by the elements, including alternate freezing and thawing. The table on page 27 is a guide to the time during which fresh concrete must be moist cured at a temperature of 70° F. or more, for greatest efficiency:

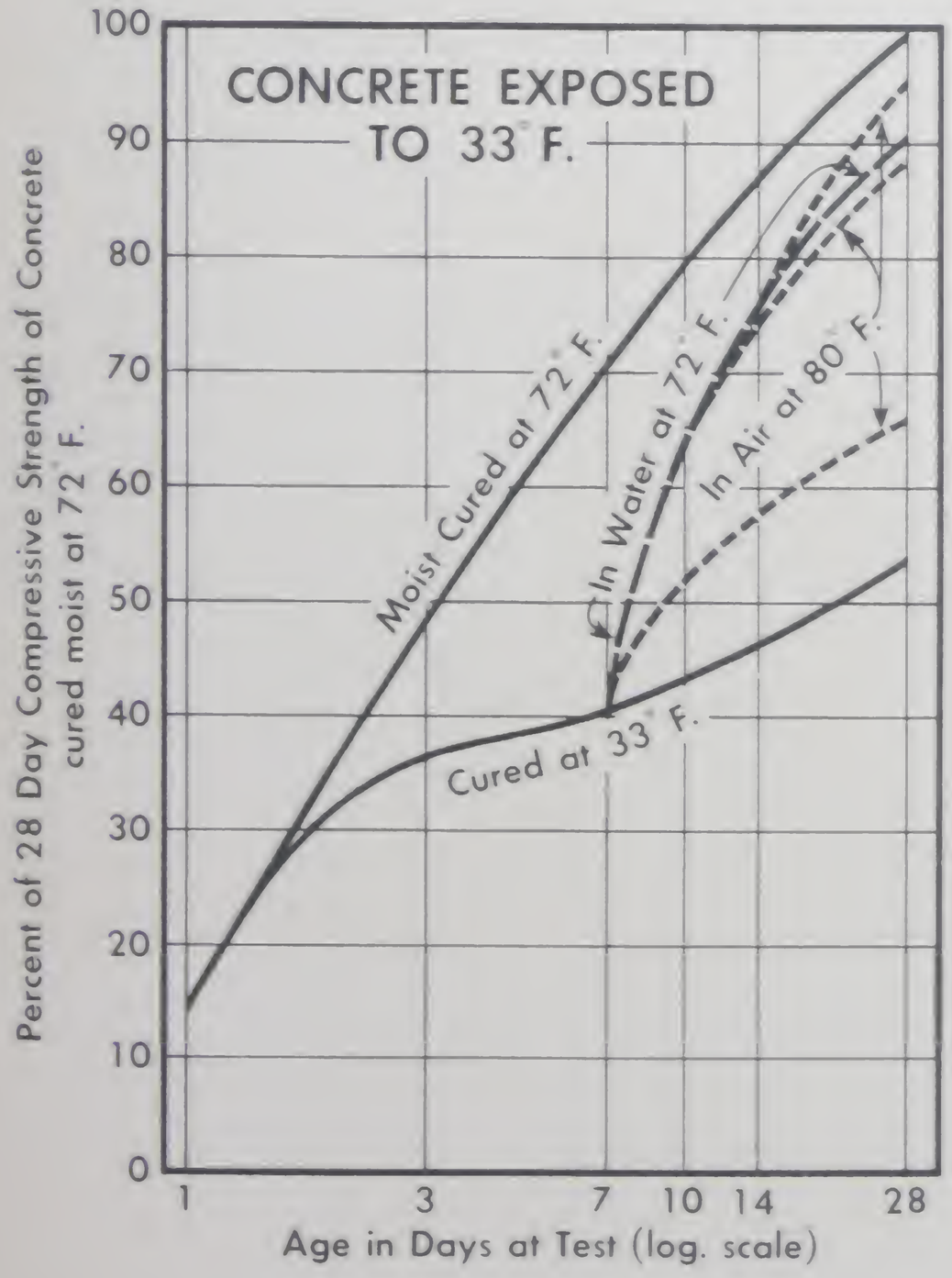
UNITED STATES POST OFFICE, FAIRMONT, W. VA. Advisory Architect: LeRoy Barton, Washington, D. C. Supervising Architect: Louis A. Simon, Washington, D. C. Engineer: N. A. Mellick, Washington, D. C. Contractor: Ross Engineering Co., Washington, D. C. Job Superintendent: Fred Brister.

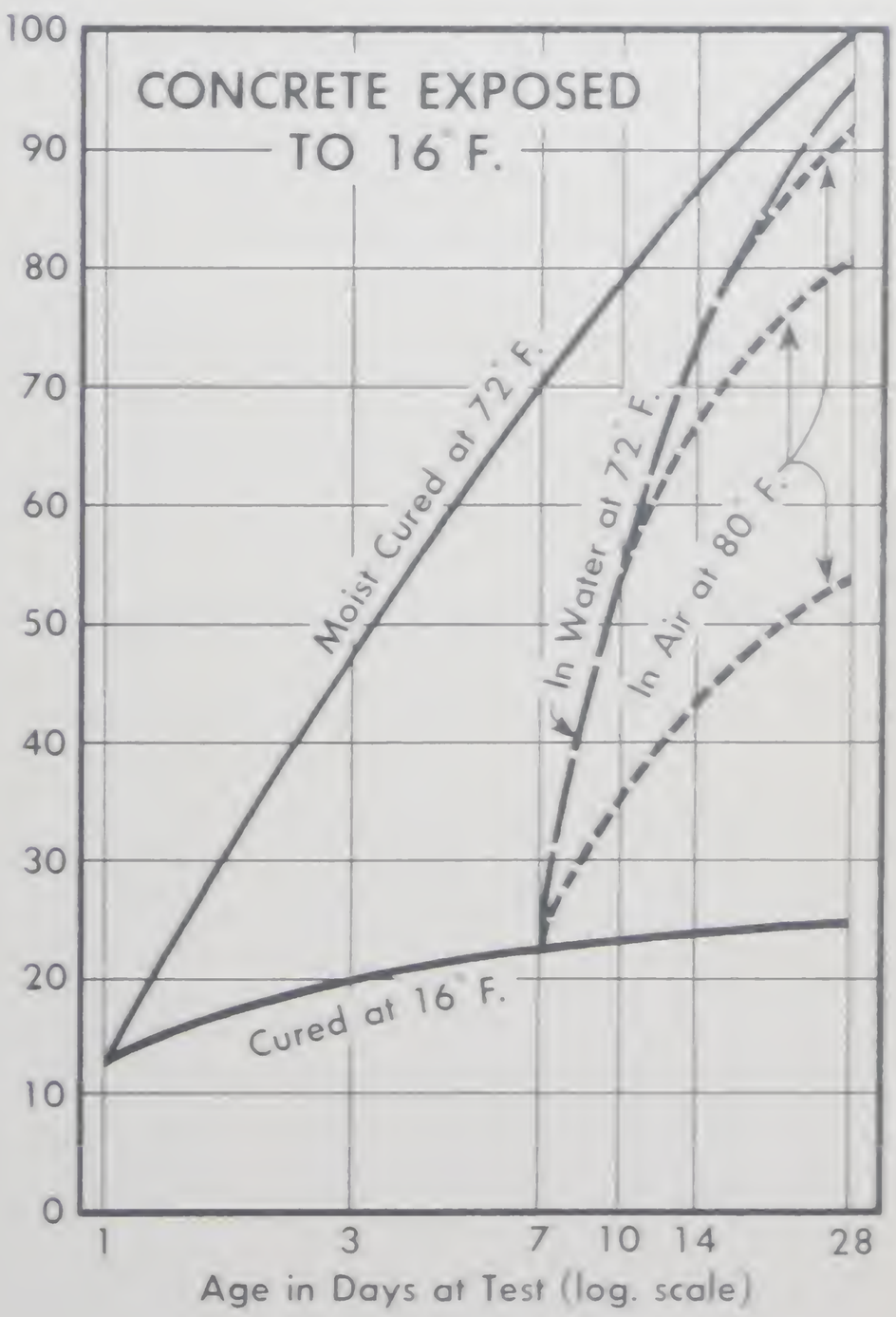
This job was started in September, 1940, with normal cement. Failure to get delivery in a car of form lumber required a change in schedule to keep the job going. A switch to Blue Streak Cement for the balance of the work allowed stripping and re-use of forms in 3 to 4 days (7 to 14 days less than was the practice on the earlier part of the job). This extra speed was so helpful that form area requirements were cut by 20,000 sq. ft. to save $1500. Poured in cold weather, heat protection was reduced to 48 hours for each day's work. The change to Blue Streak not only saved time and money, but helped to keep an efficient organization together to facilitate the whole operation.

RECOMMENDED MOIST CURING

Types of Construction	Days of Moist Curing at 70° F. or more	
	with Normal Cement	with H.E.S. Cement
Footing Foundations	5	1
Basement Walls	5	1
Sidewalks and Steps	5	1
Driveways, Curbs, etc.	5	1
Pools, Tanks, and any other watertight concrete	10	2
Structural Parts	5	1
Industrial Floors	10	2

The following graphs are a guide to the effect of temperature on concrete curing. Bear in mind that under any set of identical conditions, concrete made with early-strength cement cures much more rapidly than concrete made with normal cement.





FORDHAM ROAD AND BOSTON-PELHAM PARKWAY is one of America's heavy traffic arteries. Prolonged interruption or delay to traffic would be serious. Hence James A. Dawson. Director in charge of design for New York City Department of Parks wisely agreed with Del Balso Construction Corporation's use of "High Early" to expedite paving in the cold months of November and December 1939. Traffic was maintained by paving one side at a time. Blue Streak was used for the south half.

NORMANS KILL FARM DAIRY CO., ALBANY, N. Y. By using Blue Streak for the reinforced concrete foundation of this driveway, Sheehan Contracting Corporation saved eight days and enabled continuous entrance and egress of 24 milk wagons. The entire job was completed and ready for use, with plank protection, in only 13 hours.

The use of early-strength cement must not be considered a substitute for adequate curing. All concrete should be damp cured for as long a time as job conditions permit. Because damp curing is especially important in the early stages of hardening, the more rapid curing of early-strength cement at these early stages offers a safety factor.

ESTIMATE CONCRETE BOTH WAYS

Both normal cement and high-early-strength cement are mixed and used in the same way. Both permit ample time for handling and transportation. The choice, therefore, should be made on the basis of efficiency and economy. Except in cases where there is absolute necessity for speed, there is no hard and fast rule for choice. Each use of concrete is a special case and the determination should be made with due consideration of all the factors already mentioned. It will be advantageous for most jobs to make up job schedules in two ways—one showing time and cost with normal cement and the other with early-strength cement. Economy and convenience may then determine the choice.

NORTH AMERICAN VIEWPOINT

Service and satisfaction to its customers is the first consideration of the North American Cement Corporation. All North American Cements are as high in quality and as uniform as science and the most modern manufacturing methods and equipment permit. Whenever customers wish assistance in determining the selection of the type of cement, our service engineers are available for consultation.

The Plants of the North American Cement Corporation are outstanding in the industry for efficiency in every department. North American has independently pursued manufacturing research to the end that each plant has always given peak performance in quality of product and service to its customers. North American is justly proud of its mills and always welcomes the opportunity to show its facilities to any who are interested in seeing the scientific making of cement from the selection of raw materials on through the more than eighty stages to completion.

The illustration below is of the Security, Md., plant of the North American Cement Corporation. It is typical of the layout of a modern cement plant. The North American plants at Catskill, N. Y., and Howes Cave, N. Y., are equally impressive.

These new giant silos for the storage of finished portland cement are at the Security plant. Similar batteries at the other North American plants insure ample reserve supplies for the prompt shipment of all North American Cements and facilitate the handling of tested cement when required.

The location of the North American plants is favorable to the supplying of cement for the requirements of New England, the Middle Atlantic and the South Atlantic states. At practically any point in that territory, engineers, architects and contractors can buy North American Cements with the certainty of obtaining dependable service and satisfactory performance in use.

Each North American plant maintains twenty-four-hour laboratory control of its products. Complete chemical and physical testing facilities are manned by technicians of special competence. In addition to the constant laboratory control of product, North American is continually engaged in product research to discover and apply all possible improvements to cement and the art of making concrete.

The chemical laboratory shown in the photograph is typical of those at all North American plants.

NORTH AMERICAN CEMENT CORPORATION

Offices: Albany · Boston · New York · Baltimore · Washington

Plants: Catskill, N. Y. · Howes Cave, N. Y. · Security, Md. · Martinsburg, W. Va.

BLUE STREAK

HIGH-EARLY-STRENGTH PORTLAND CEMENT

NORTH AMERICAN CEMENT CORPORATION